

RESILIENT WIND DEFLECTOR

BACKGROUND OF THE INVENTION

- [1] The present invention relates to a vehicle sun roof, and more particularly to a resilient wind deflector therefore.
- [2] Conventional vehicle sunroofs often include a wind deflector to minimize drafts and noises caused by wind when driving with the sunroof fully or partially open. Due to limited packaging space, conventional wind deflectors are movable rigid shields which require pivots, arms and spring biases to operate.
- [3] Typically, when the sun roof is opened a spring bias extends the wind deflector above the roof line. When the sunroof is retracted, the movable sunroof portion overcomes the spring bias to retract the wind deflector. Other actively driven wind deflectors are also known.
- [4] Although effective, conventional wind deflectors are relatively complicated and expensive assemblies. The components which permit extension and retraction of the wind deflector are primarily arranged beneath the leading edge of the sunroof opening. This housing may be relatively deep and reduce the ceiling height of the vehicle. In addition, the wind deflector may actually momentarily increase wind noise when deploying due to the flow transition from the flat roof to the extending wind deflector.
- [5] Accordingly, it is desirable to provide an inexpensive and uncomplicated wind deflector which extends rapidly and requires minimal space.

SUMMARY OF THE INVENTION

- [6] The wind deflector assembly according to the present invention includes a wind deflector frame member which mounts a resilient member within a path of the closure member. The resilient member extends above the vehicle roof when in a deployed position so as to operate as a wind deflector. The resilient member is manufactured of a flexible material such as rubber or closed cell foam. The resilient member deploys due to the flexibility of the material in that the free state is the deployed condition. Operation of the

closure member collapses or folds over the resilient member from the deployed free state to a collapsed or retracted state.

- [7] The present invention therefore provides an inexpensive and uncomplicated wind deflector which extends rapidly and requires minimal space.

BRIEF DESCRIPTION OF THE DRAWINGS

- [8] The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiment. The drawings that accompany the detailed description can be briefly described as follows:

[9] Figure 1 is a general plan view of a vehicle roof with a sun-roof therein for use with the present invention;

[10] Figure 2 is a sectional view taken along line A-A in Figure 1 of a wind deflector in a first position; and

[11] Figure 3 is a sectional view taken along line A-A in Figure 1 of a wind deflector in a second position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

- [12] Figure 1 illustrates a top view of a sunroof assembly 10. The sunroof assembly 10 includes a roof opening 12 within a vehicle roof (illustrated schematically at R) and a closure member 14 which selectively exposes and closes the opening 12 in response to a drive and control arrangement (not shown) in a known manner. It should be understood that various panels which open when vehicle is moving will benefit from the present invention.

[13] Along a leading edge 16 of the roof opening 12 a wind deflector assembly 18 selectively extends above the vehicle roof R (Figures 2 and 3) to deflect the slip-stream and minimize wind flow into the vehicle when the closure member 14 is open.

[14] Referring to Figure 2, the closure member 14 is illustrated in an open position. That is, the opening 12 is closed by closure member 14 (Figure 3). A closure member frame 20 movably supports the closure member 14 as generally known. When closed, a forward closure member seal 22 (Figure 3) preferably contacts a forward frame member 24 of the

closure member frame 20. The forward frame member 24 is located along the leading edge of the opening 12 and under the vehicle roof R. It should be understood that various frame arrangements and closure member drive systems will benefit from the present invention.

[15] The wind deflector assembly 18 is mounted to the closure member frame 20 downstream of the forward frame member 24 within the path of the closure member 14. The wind deflector assembly 18 includes a wind deflector frame member 26 mounted to the closure member frame 20 and a resilient member 28 mounted to the closure member frame 20. The resilient member extends above the vehicle roof R when in the deployed position so as to operate as a wind deflector. It should be understood that the size and profile of the resilient member is related to the expected wind force and opening size.

[16] The resilient member 28 preferably defines a profile of a hollow triangle in cross-section. That is, the resilient member includes a forward side 30a, an aft side 30b and a bottom side 30c. It should be understood that other profiles will also benefit from the present invention.

[17] The bottom side 30c includes a multiple of clips 32 which engage the wind deflector frame member 26 to provide for replacement and/or maintenance of the resilient member 28 without the requirement of disassembling the frame 20. The clips 32 are integral and/or bonded to the resilient member 28 to preferably form a U-channel.

[18] The resilient member 28 is manufactured of a flexible material such as rubber or closed cell foam. The material must be rigid enough to withstand expected wind force yet be flexible enough to collapse (Figure 3) in response to contact with the closure member 14. The resilient member 18 advantageously deploys due to the flexibility of the material such that the free state of the formed resilient member 28 is the deployed condition.

[19] Referring to Figure 3, the resilient member 38 is in a collapsed position which occurs when the closure member 14 is closed over the resilient member 28. That is, operation of the closure member 12 collapses or folds over the resilient member 28 from the deployed free state (Figure 2) to the collapsed state (Figure 3). As the forward closure member seal 22 contact the resilient member 38, minimal wear is applied to the resilient member 38 during each closure cycle.

- [20] As no drive or pivot arrangements are required for the wind deflector assembly 18, a particularly thin sun-roof construction is possible.
- [21] It should be understood that relative positional terms such as "forward," "aft," "upper," "lower," "above," "below," and the like are with reference to the normal operational attitude of the vehicle and should not be considered otherwise limiting.
- [22] The foregoing description is exemplary rather than defined by the limitations within. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been disclosed, however, one of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described. For that reason the following claims should be studied to determine the true scope and content of this invention.